Integral Consulting Inc.
200 Harry S. Truman Parkway
Suite 330
Annapolis, MD 21401

telephone: 410.573.1982
facsimile: 410.573.9746
www.integral-corp.com

LETTER OF TRANSMITTAL

Date: August 29, 2014 Project No: C1165-0301

To: Erica Bergman, NJDEP

From: Phil Goodrum, Integral Consulting Inc.

Re: Paulsboro Public Water System Quarter 3 Sampling Results (NJ 0814001)
Solvay West Deptford Plant
10 Leonard Lane
West Deptford, NJ 08086-2150

The following is enclosed: ☐ for your use ☒ for your files ☐ per your request

Quantity	Item
2	**Data Report, Quarter 3, 2014 – Paulsboro PWS Sampling on July 8, 2014**
2	**CDs, including:** - **Data Report** - **Eurofins Laboratory Reports** - **TestAmerica Laboratory Reports** - **LDC Data Validation Report** - **EDDs**

Remarks:

On behalf of Solvay Specialty Polymers USA, LLC (Solvay), please find enclosed the sampling results for perfluoroalkyl compounds (PFCs) from the Paulsboro public water system (PWS). Enclosed are two copies of the data in New Jersey Department of Environmental Protection (NJDEP) electronic data delivery (EDD) format and a summary report for your internal distribution. These EDDs were verified by Solvay to be complete and free of errors with NJDEP's online tool, Electronic Data Submittal Applications (EDSA7) version 7.1.5.

The report includes a description of the wells that were sampled, a figure illustrating where samples were collected within the distribution system, a set of tables summarizing the laboratory results, and a copy of the data validation report prepared by an independent validator. In addition, the report includes a table that summarizes some of the current state and federal interim drinking water guidelines for PFCs. While these guidelines are non-binding at this time, they may provide Paulsboro PWS with a helpful perspective to facilitate communication of findings to the community. Finally, a table is included to summarize the results of a screening of NJDEP drinking water criteria and groundwater criteria for other target analytes.

This enclosure for Paulsboro constitutes the data report for the third round of sampling (Quarter 3), conducted on July 8, 2014. Data reports from the first and second rounds of sampling were submitted on January 6 and June 4, 2014. A fourth round of sampling will be conducted at the Paulsboro PWS in September or October of 2014.

At the Department's request, Integral sent information regarding the proposed sampling locations to Sandy Krietzman on July 7 (prior to the July 8 event). The samples collected largely reflect the plans that were presented. Details regarding the status of the treatment and distribution systems during the sampling events are presented in the report.

Solvay has adopted a rigorous quality assurance protocol for sampling, chain of custody documentation, analysis, and reporting of results. Each PWS sampling event includes field duplicates, laboratory quality control samples, and third party (independent) data validation. Please feel free to contact Mitch Gertz with any questions.

Sent via:

- ☐ U.S. Mail
- ☐ Fax
- ☐ Other
- ☒ Federal Express
- ☐ Courier

cc: John Daly, Paulsboro Water Superintendent
Mitch Gertz, Solvay Specialty Polymers USA, LLC
Tom Buggey, LSRP, Roux Associates Inc.
Nidal Azzam, U.S. Environmental Protection Agency
Andrew Park, U.S. Environmental Protection Agency
Chris Roe, Fox Rothschild LLP

integral consulting inc.

DATA REPORT
QUARTER 3, 2014

Paulsboro PWS Sampling on July 8, 2014

Prepared for
Solvay Specialty Polymers USA, LLC
10 Leonard Lane
West Deptford, NJ 08086

Prepared by
Integral Consulting Inc.
200 Harry S. Truman Parkway
Suite 330
Annapolis, MD 21401

August 29, 2014

DATA REPORT
QUARTER 3, 2014

Paulsboro PWS
Sampling on July 8, 2014

Prepared for
Solvay Specialty Polymers USA, LLC
10 Leonard Lane
West Deptford, NJ 08086

Prepared by

200 Harry S. Truman Parkway
Suite 330
Annapolis, MD 21401

August 29, 2014

On July 8, 2014, Integral Consulting Inc. (Integral), consultant to Solvay Specialty Polymers USA, LLC (Solvay), conducted Quarter 3 sampling and collected water samples from the three water supply wells maintained by the Paulsboro public water system (PWS), as well as distribution points at City Hall and the Port of Paulsboro office. The samples were submitted to Eurofins Eaton Analytical, Inc. (Monrovia, CA), a New Jersey-certified analytical testing laboratory for analysis of perfluoroalkyl compounds (PFCs). In addition, split samples were submitted to TestAmerica Laboratories, Inc. (Edison, NJ[1]), also a New Jersey-certified analytical laboratory, for analysis of conventional and expanded parameters.

Figure 1 illustrates where samples were collected within the Paulsboro PWS treatment system. Based on our understanding of Paulsboro PWS operations, Well #7 was taken offline on April 4, 2014, and has not distributed water since, except for a 2-hour period during the April 10 sampling event. During the sampling event on July 8, only Well #8 was actively supplying water to the borough. The Integral team requested that the wells be switched such that Well #9 water would run through the Treatment Plant so a treated Well #9 sample could be collected, but such a changeover would take the Paulsboro water crew several days to perform. Therefore, a treated Well #9 sample was not taken.

Raw water was sampled from Wells #7 and #9, and treated water was sampled from Well #8. In addition to system wells, water samples were collected from the following distribution points throughout the borough on July 8: City Hall (Delaware Street), and the Port of Paulsboro office (Universal Road). These distribution points are additional indicators of system drinking water at the time of sampling. Results at these distribution points should only reflect water from Well #8, which was the only well actively distributing water during sample collection.

RESULTS FROM JULY 8 SAMPLING EVENT

Table 1 summarizes the concentrations of PFCs measured in each raw, treated, and drinking water sample collected on July 8, 2014 (Quarter 3), as well as prior sampling events on April 10, 2014 (Quarter 2) and November 16, 2013 (Quarter 1). Table 2 summarizes all detected PFC concentrations from both events, while Table 3 presents method detection limits (MDLs) and method reporting limits (MRLs). Data from Tables 1–3 are also provided in electronic files, using the electronic data delivery (EDD) format specified by New Jersey Department of Environmental Protection (NJDEP). These EDDs were verified by Solvay to be complete and free of errors with NJDEP's online tool, Electronic Data Submittal Applications (EDSA7) version 7.1.5, available at www.state.nj.us/dep/srp/hazsite/software/edsa/. Laboratory results for the

[1] Non-PFC constituents are analyzed at multiple TestAmerica laboratories. TestAmerica St. Louis (Earth City, MO) performs analyses of radium; TestAmerica Savannah (GA) performs analyses of herbicides, anions (barium, chloride, fluoride, and sulfate), cations (calcium, iron, magnesium, potassium, sodium), and total hardness; TestAmerica Edison (NJ) performs analyses of the remaining non-PFCs listed in the "Expanded Analyte Summary" section of this report.

samples collected on July 8, 2014 were validated by Laboratory Data Consultants, Inc. (Carlsbad, CA), an independent third party validator.

The laboratory report prepared by Eurofins and included in this submission summarizes the quality control sample results (i.e., matrix spike [MS] and matrix spike duplicate [MSD]). For the sample date group (SDG) reported here, additional volume was not collected to run MS/MSD samples. Instead, Eurofins performed MS/MSD analyses on non-project samples following method specifications. All of the quality control samples results are within the advisory limits specified by U.S. Environmental Protection Agency (EPA) Method 537.

PFCs are currently unregulated in drinking water. Table 4 summarizes a range of nonbinding drinking water guidelines for perfluorooctanoate acid (PFOA) and perfluorooctanesulfonic acid (PFOS) available from EPA, New Jersey, North Carolina, and Minnesota. For the Quarter 3 sampling at Paulsboro, one raw water sample collected at Well #9 was above the New Jersey drinking water guideline for PFOA (i.e., 40 parts per trillion or ppt) and was measured at 44 ppt, with concentrations across locations ranging from 17 to 44 ppt.

PFOS was detected below 10 ppt in all samples, including parent and duplicate raw water samples from Well #7, raw water from Well #9, treated water from Well #8, and drinking water samples from the City Hall sink tap and the Port of Paulsboro office break area sink.

Three additional PFCs were detected for which drinking water guidelines have not been established – perfluorononanoic acid (PFNA), perfluorodecanoic acid (PFDA), and perfluoroundecanoic acid (PFUnDA). PFNA was detected in all six samples. PFNA was measured at 140 ppt in Well #7 raw water (for both the parent and field duplicate samples) and 11 ppt in Well #9 raw water. Concentrations between 15 and 16 ppt were measured in Well #8 treated water (which was supplying water to the borough) as well as the two samples collected from the distribution system (i.e., City Hall sink tap and the Port of Paulsboro office break area sink). PFDA was detected in five out of six samples from four sample locations at concentrations between the MDL and MRL. PFUnDA was detected in one sample from Well #7 at a concentration between the MDL and MRL.

Variability in PFC Results across Sampling Events

Concentrations across the three sampling events were relatively consistent for PFNA, PFOA, and PFOS at Well #8 and Well#9, and more variable at Well #7. Table 6 summarizes the range, arithmetic mean, and relative percent difference (RPD) for each of these PFCs and wells.

For Wells #8 and #9, concentrations varied less than 4 ppt for PFNA and less than 10 ppt for PFOS. For PFOA, concentrations varied less than 6 ppt at Well #8, but was more variable at Well #9 with a maximum of 44 ppt in Quarter 3 and an overall RPD of 52 percent across the three sampling events.

For Well #7, the concentrations varied less than 3 ppt for PFOS and 15 ppt for PFOA (maximum of 36 ppt in Quarter 3). Concentrations of PFNA varied between 80 and 140 ppt, with an overall RPD of 42 percent.

Distribution point samples were collected at the City Hall sink tap and Port of Paulsboro office in two sampling events (Quarter 2 and Quarter 3). As explained in the data report for Quarter 2, it is likely that some Well #7 purge water mixed with Well #8 treated water, resulting in samples that were unlikely to be representative of the actual conditions within the distribution system of the borough during the operation of Well #8. During Quarter 3 sampling, purge water from Well #7 was not directed to the distribution system. As expected, concentrations in samples collected in Quarter 3 were very consistent with the Well #8 samples collected in Quarter 3, with RPDs of less than 8 percent for PFNA, PFOA, and PFOS.

Expanded Analyte Summary

During the sampling event that occurred on July 8, 2014, the following nonconventional parameters (i.e., expanded analytes) were assessed in addition to PFCs and conventionals:

- Radium 226/228
- Regulated compound list for semivolatile organic compounds (SVOCs)
- Full list of volatile organic compounds (VOCs) as well as 15 tentatively identified compounds (TICs)
- Pesticides and polychlorinated biphenyls (PCBs)
- Metals (inductively coupled plasma [ICP] methods)
- Inorganic anions
- Total dissolved solids
- Chlorinated herbicides.

Drinking Water Results

Six detected constituents on the expanded target analyte list (TAL) exceeded current drinking water criteria and are summarized in Table 5. Raw water was collected from parent and duplicate samples at Well #7. Aluminum was measured at 228 and 235 parts per billion (ppb; parent and duplicate samples, respectively) compared with the drinking water standard of 200 ppb. Iron was measured at 7,060 and 6,850 ppb (parent and duplicate samples, respectively) compared with the drinking water standard of 300 ppb. Manganese was measured at 109 ppb for both the parent and duplicate samples compared with the drinking water standard of 50 ppb. At Well #7, pH was measured at 5.66 and 5.23 SU (standard units) in

the parent and duplicate samples, respectively, compared with the drinking water standard of 6.5 to 8.5 SU.

Raw water was collected from Well #9. Aluminum was measured at 1,480 ppb compared with the drinking water standard of 200 ppb. Iron was measured at 9,400 ppb compared with the drinking water standard of 300 ppb. Lead was measured at 21.6 ppb compared with the drinking water standard of 15 ppb. Manganese was measured at 164 ppb compared with the drinking water standard of 50 ppb. Sodium was measured at 51,000 ppb compared with the drinking water standard of 50,000 ppb. At Well #9, pH was measured at 4.54 SU compared with the drinking water standard of 6.5 to 8.5 SU.

Drinking water samples were collected from the City Hall sink tap and the Port of Paulsboro office break area sink. Aluminum was measured at 477 ppb at the Port of Paulsboro compared with the drinking water standard of 200 ppb. Iron was measured at 629 ppb at City Hall and 5,180 ppb at the Port of Paulsboro compared with the drinking water standard of 300 ppb. Manganese was measured at 53.2 ppb at City Hall and 181 ppb at the Port of Paulsboro compared with the drinking water standard of 50 ppb.

An additional 12 of the expanded analytes were detected across 5 locations for which drinking water guidelines have not been established. 4-methyl-2-pentanone and di-*n*-butyl phthalate were each detected at a single location and each measured at 1.2 ppb. Bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane were each detected at three locations and measured at 2.6 to 9.2 ppb, 7.2 to 20 ppb, 3.1 to 7.7 ppb and 6 to 15 ppb, respectively. Calcium, magnesium, nickel, potassium, radium 226, and radium 228 were each detected at all five sample locations and ranged from 7,320 to 18,400 ppb, 3,750 to 4,200 ppb, 22.7 to 69 ppb, 2,760 to 3,590 ppb, 0.85 to 1.58 pCi/L and 0.871 to 2.12 pCi/L, respectively.

Groundwater Results

Ten detected constituents on the expanded TAL exceeded current groundwater criteria and are summarized in Table 5. Raw water was collected from parent and duplicate samples at Well #7. Aluminum was measured at 228 and 235 ppb (parent and duplicate samples, respectively) compared with the groundwater standard of 200 ppb. Beryllium was measured at 2.3 and 2.4 ppb (parent and duplicate samples, respectively) compared with the groundwater standard of 1 ppb. Iron was measured at 7,060 and 6,850 ppb (parent and duplicate samples, respectively) compared with the groundwater standard of 300 ppb. Lead was measured at 9.6 ppb compared with the groundwater standard of 5 ppb. Manganese was measured at 109 ppb for both the parent and duplicate samples compared with the groundwater standard of 50 ppb. At Well #7, pH was measured at 5.66 and 5.23 SU in the parent and duplicate samples, respectively, compared with the groundwater standard of 6.5 to 8.5 SU.

Treated water was collected from Well #8. Chlorodibromomethane was measured at 7.2 ppb compared with the groundwater standard of 1 ppb. Dichlorobromomethane was measured at 6 ppb compared with the groundwater standard of 1 ppb.

Raw water was collected from Well #9. Aluminum was measured at 1,480 ppb compared with the groundwater standard of 200 ppb. Beryllium was measured at 1.2 ppb compared with the groundwater standard of 1 ppb. Iron was measured at 9,400 ppb compared with the groundwater standard of 300 ppb. Lead was measured at 21.6 ppb compared with the groundwater standard of 5 ppb. Manganese was measured at 164 ppb compared with the groundwater standard of 50 ppb. Sodium was measured at 51,000 ppb compared with the groundwater standard of 50,000 ppb. At Well #9, pH was measured at 4.54 SU compared with the groundwater standard of 6.5 to 8.5 SU.

Drinking water samples were collected from the City Hall sink tap and the Port of Paulsboro office break area sink. Aluminum was measured at 477 ppb at the Port of Paulsboro compared with the groundwater standard of 200 ppb. Beryllium was measured at 2 ppb at the Port of Paulsboro compared with the groundwater standard of 1 ppb. Bromoform was measured at 6.9 ppb at City Hall and 9.2 ppb at the Port of Paulsboro compared with the groundwater standard of 4 ppb. Chlorodibromomethane was measured at 15 ppb at City Hall and 20 ppb at the Port of Paulsboro compared with the groundwater standard of 1 ppb. Dichlorobromomethane was measured at 11 ppb at City Hall and 15 ppb at the Port of Paulsboro compared with the groundwater standard of 1 ppb. Iron was measured at 629 ppb at City Hall and 5,180 ppb at the Port of Paulsboro compared with the groundwater standard of 300 ppb. Manganese was measured at 53.2 ppb at City Hall and 181 ppb at the Port of Paulsboro compared with the groundwater standard of 50 ppb.

An additional seven of the expanded analytes were detected across five locations for which groundwater guidelines have not been established. 4-methyl-2-pentanone was detected at a single location and measured at 1.2 ppb. Calcium, magnesium, potassium, radium 226, radium 228, and radium 226/228 were each detected at all five sample locations and ranged from 7,320 to 18,400 ppb, 3,750 to 4,200 ppb, 2,760 to 3,590 ppb, 0.85 to 1.58 pCi/L, 0.871 to 2.12 pCi/L and 1.721 to 3.61 pCi/L, respectively.

Table 1. Paulsboro PWS PFC Concentrations by Well, both Detects and Nondetects [a,b]

Well or Tap Location	Sample No.	Sample Type	Field Duplicate	Sample Date	Units	PFOA	PFOS	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA
PB - City Hall sink tap	GW0103	Drinking water		4/10/2014	ng/L	25	6.3	93	0.42 J	0.68 J	0.6 U	0.8 U
	GW0165	Drinking water		7/8/2014	ng/L	17	8.4	15	0.57 J	0.4 U	0.6 U	0.8 U
PB - Port break area sink	GW0104	Drinking water		4/10/2014	ng/L	18	6.8	64	0.49 J	0.59 J	0.6 U	0.8 U
	GW0166	Drinking water		7/8/2014	ng/L	19	8.4	16	0.64 J	0.4 U	0.6 U	0.8 U
Well #7	GW0003	Raw water		11/26/2013	ng/L	23	4.8	92	0.39 J	0.77 J	0.6 U	2.5 U
(PB-PWS-7)	GW0004	Raw water	X	11/26/2013	ng/L	24	4.9	88	0.41 J	0.46 J	0.6 U	2.5 U
	GW0099	Raw water		4/10/2014	ng/L	23	4.5	95	0.31 J	0.51 J	0.6 U	0.8 U
	GW0100	Raw water	X	4/10/2014	ng/L	21	3.6	80	0.3 J	0.63 J	0.6 U	0.8 U
	GW0161	Raw water		7/8/2014	ng/L	36	6.4	140	0.46 J	0.55 J	0.6 U	0.8 U
	GW0163	Raw water	X	7/8/2014	ng/L	36	6.1	140	0.45 J	0.4 U	0.6 U	0.8 U
	GW0005	Treated water		11/26/2013	ng/L	26	5.7	96	0.57 J	1.2 J	0.6 U	0.8 U
	GW0006	Treated water	X	11/26/2013	ng/L	27	5.9	110	0.42 J	0.74 J	0.6 U	0.8 U
	GW0101	Treated water		4/10/2014	ng/L	23	4.8	100	0.35 J	0.83 J	0.6 U	0.8 U
	GW0102	MidTreatment		4/10/2014	ng/L	21	4.8	100	0.33 J	0.58 J	0.6 U	0.8 U
Well #8	GW0001	Raw water		11/26/2013	ng/L	19	15	15	0.78 J	0.76 J	0.6 U	0.8 U
(PB-PWS-8)	GW0096	Raw water		4/10/2014	ng/L	13	5.7	13	0.39 J	0.4 U	0.6 U	0.8 U
	GW0098	Treated water		4/10/2014	ng/L	13	6.8	14	0.44 J	0.4 U	0.6 U	0.8 U
	GW0162	Treated water		7/8/2014	ng/L	18	7.8	15	0.46 J	0.4 U	0.6 U	0.8 U
Well #9	GW0002	Raw water		11/26/2013	ng/L	34	1.6 J	7.4	0.3 U	0.4 U	0.6 U	0.8 U
(PB-PWS-9)	GW0097	Raw water		4/10/2014	ng/L	26	1.4 J	10	0.3 U	0.4 U	0.6 U	0.8 U
	GW0164	Raw water		7/8/2014	ng/L	44	5.5	11	0.3 U	0.4 U	0.6 U	0.8 U
FieldBlank	GW0007	QA/QC		11/26/2013	ng/L	0.2 U	0.2 U	0.4 U	0.3 U	0.4 U	0.6 U	0.8 U
	FB0001	QA/QC		4/10/2014	ng/L	0.2 U	0.2 U	0.4 U	0.3 U	0.4 U	0.6 U	0.8 U
	FB0001	QA/QC		7/8/2014	ng/L	0.2 U	0.2 U	0.4 U	0.3 U	0.4 U	0.6 U	0.8 U

Notes:

PFC = perfluoroalkyl compound
PFDA = perfluorodecanoic acid
PFDoDA = perfluorododecanoic acid
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoate acid
PFOS = perfluorooctanesulfonic acid
PFTrDA = perfluorotridecanoic acid
PFUnDA = perfluoroundecanoic acid
PWS = public water system
QA/QC = quality assurance and quality control

Drinking water = water supplied to the community represented by sample collected from the system after mixing of treated water from multiple wells and/or supplemental water
MidTreatment = water taken from a sampling port location after the cation exchange filters and before lime addition and chlorine addition
Raw water = raw water sample collected from well (prior to treatment)
Treated water = sample collected from well after treatment but before mixing with water from other wells or supplemental water

J = result was detected at or greater than the method detection limit and less than method reporting limit
U = result was not detected at the stated method detection limit

[a] Laboratories reported detected concentrations to two significant figures, while nondetects are reported as the method detection limit, which were reported to one significant figure. Units for all results are reported here as nanograms per liter (ng/L) or parts per trillion (ppt).
[b] Results reported by Eurofins Eaton Analytical, Inc. and validated by Laboratory Data Consultants, Inc.

Table 2. Paulsboro PWS PFC Concentrations by Well, Detected Analytes Only [a,b]

Well or Tap Location	Sample No.	Sample Type	Field Duplicate	Sample Date	Units	PFOA	PFOS	PFNA	PFDA	PFUnDA
PB - City Hall sink tap	GW0103	Drinking water		4/10/2014	ng/L	25	6.3	93	0.42 J	0.68 J
	GW0165	Drinking water		7/8/2014	ng/L	17	8.4	15	0.57 J	--
PB - Port break area sink	GW0104	Drinking water		4/10/2014	ng/L	18	6.8	64	0.49 J	0.59 J
	GW166	Drinking water		7/8/2014	ng/L	19	8.4	16	0.64 J	--
Well #7	GW0003	Raw water		11/26/2013	ng/L	23	4.8	92	0.39 J	0.77 J
(PB-PWS-7)	GW0004	Raw water	X	11/26/2013	ng/L	24	4.9	88	0.41 J	0.46 J
	GW0099	Raw water		4/10/2014	ng/L	23	4.5	95	0.31 J	0.51 J
	GW0100	Raw water	X	4/10/2014	ng/L	21	3.6	80	0.30 J	0.63 J
	GW0161	Raw water		7/8/2014	ng/L	36	6.4	140	0.46 J	0.55 J
	GW0163	Raw water	X	7/8/2014	ng/L	36	6.1	140	0.45 J	--
	GW0005	Treated water		11/26/2013	ng/L	26	5.7	96	0.57 J	1.2 J
	GW0006	Treated water	X	11/26/2013	ng/L	27	5.9	110	0.42 J	0.74 J
	GW0101	Treated water		4/10/2014	ng/L	23	4.8	100	0.35 J	0.83 J
	GW0102	MidTreatment		4/10/2014	ng/L	21	4.8	100	0.33 J	0.58 J
Well #8	GW0001	Raw water		11/26/2013	ng/L	19	15	15	0.78 J	0.76 J
(PB-PWS-8)	GW0096	Raw water		4/10/2014	ng/L	13	5.7	13	0.39 J	--
	GW0098	Treated water		4/10/2014	ng/L	13	6.8	14	0.44 J	--
	GW0162	Treated water		7/8/2014	ng/L	18	7.8	15	0.46 J	--
Well #9	GW0002	Raw water		11/26/2013	ng/L	34	1.6 J	7.4	--	--
(PB-PWS-9)	GW0097	Raw water		4/10/2014	ng/L	26	1.4 J	10	--	--
	GW0164	Raw water		7/8/2014	ng/L	44	5.5	11	--	--

Notes:

PFC = perfluoroalkyl compound
PFDA = perfluorodecanoic acid
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoate acid
PFOS = perfluorooctanesulfonic acid
PFUnDA = perfluoroundecanoic acid
PWS = public water system
-- = not detected at the method detection limit

Drinking water = water supplied to the community represented by sample collected from the system after mixing of treated water from multiple wells and/or supplemental water
MidTreatment = water taken from a sampling port location after the cation exchange filters and before lime addition and chlorine addition
Raw water = raw water sample collected from well (prior to treatment)
Treated water = sample collected from well after treatment but before mixing with water from other wells or supplemental water

J = result was detected at or greater than the method detection limit and less than method reporting limit

[a] Laboratories reported detected concentrations to two significant figures, while nondetects are reported as the method detection limit, which were reported to one significant figure. Units for all results are reported here as nanograms per liter (ng/L) or parts per trillion (ppt).
[b] Results reported by Eurofins Eaton Analytical, Inc. and validated by Laboratory Data Consultants, Inc.

Table 3. Paulsboro PWS PFC Detection Limits by Well for Samples Collected July 8, 2014 [a,b]

Well or Tap Location	Sample No.	Sample Type	Field Duplicate	Sample Date	Units	PFOA		PFOS		PFNA		PFDA		PFUnDA		PFDoDA		PFTrDA	
						MDL	MRL	MDL	MRL	MDL	MRL	MDL	MRL	MDL	MRL	MDL	MRL	MDL	MRL
PB - City Hall sink tap	GW0165	Drinking water		7/8/2014	ng/L	0.2	2.5	0.2	2.5	0.4	2.5	0.3	2.5	0.4	2.5	0.6	2.5	0.8	2.5
PB - Port break area sink	GW0166	Drinking water		7/8/2014	ng/L	0.2	2.5	0.2	2.5	0.4	2.5	0.3	2.5	0.4	2.5	0.6	2.5	0.8	2.5
Well #7	GW0161	Raw water		7/8/2014	ng/L	0.2	2.5	0.2	2.5	2.0	12.0	0.3	2.5	0.4	2.5	0.6	2.5	0.8	2.5
(PB-PWS-7)	GW0163	Raw water	X	7/8/2014	ng/L	0.2	2.5	0.2	2.5	2.0	12.0	0.3	2.5	0.4	2.5	0.6	2.5	0.8	2.5
Well #8 (PB-PWS-8)	GW0162	Treated water		7/8/2014	ng/L	0.2	2.5	0.2	2.5	0.4	2.5	0.3	2.5	0.4	2.5	0.6	2.5	0.8	2.5
Well #9 (PB-PWS-9)	GW0164	Raw water		7/8/2014	ng/L	0.2	2.5	0.2	2.5	0.4	2.5	0.3	2.5	0.4	2.5	0.6	2.5	0.8	2.5
FieldBlank	FB0001	QA/QC		7/8/2014	ng/L	0.2	2.5	0.2	2.5	0.4	2.5	0.3	2.5	0.4	2.5	0.6	2.5	0.8	2.5

Notes:

MDL = method detection limit
MRL = method reporting limit
PFC = perfluoroalkyl compound
PFDA = perfluorodecanoic acid
PFDoDA = perfluorododecanoic acid
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoate acid
PFOS = perfluorooctanesulfonic acid
PFTrDA = perfluorotridecanoic acid
PFUnDA = perfluoroundecanoic acid
PWS = public water system
QA/QC = quality assurance and quality control

Drinking water = water supplied to the community represented by sample collected from the system after mixing of treated water from multiple wells and/or supplemental water
MidTreatment = water taken from a sampling port location after the cation exchange filters and before lime addition and chlorine addition
Raw water = raw water sample collected from well (prior to treatment)
Treated water = sample collected from well after treatment but before mixing with water from other wells or supplemental water

[a] Units for all results are nanograms per liter (ng/L) or parts per trillion (ppt). Laboratories reported method detection limits to one significant figure and quantitation limits to two significant figures.
[b] Results reported by Eurofins Eaton Analytical, Inc.

Table 4. Federal and State PFC Guidelines for Drinking Water

Agency	Chemical Name [a]						
	PFOA	PFOS	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA
U.S. Environmental Protection Agency [b]	400	200	--	--	--	--	--
North Carolina Department of Environmental and Natural Resources [c]	200	--	--	--	--	--	--
New Jersey Department of Environmental Protection [d]	40	--	--	--	--	--	--
Minnesota Department of Health [e]	300	300	--	--	--	--	--

Sources:

MDH. 2013. Health guidelines for perfluorochemicals (PFCs) in drinking water. www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/drinkingwater.html. Minnesota Department of Health, Environmental Health Division, St. Paul, MN.

NCDENR. 2013. Appendix #1: Interim maximum allowable concentrations (IMACs). pp. 23-24. In: North Carolina Administrative Code Title 15A - Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina. Last amended April 1. Available at: http://portal.ncdenr.org/web/wq/ps/csu/gwstandards. North Carolina Department of Environmental and Natural Resources, Division of Water Quality, Raleigh, NC. 31 pp.

NJDEP. 2007. Determination of perfluorooctanoic acid (PFOA) in aqueous samples. Final Report. New Jersey Department of Environmental Protection, Division of Water Supply, Bureau of Safe Drinking Water, Trenton, NJ. 17 pp. January.

USEPA. 2009. Provisional health advisories for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Available at: http://water.epa.gov/action/advisories/drinking/upload/2009_01_15_criteria_drinking_pha-PFOA_PFOS.pdf. U.S. Environmental Protection Agency. 5 pp. January 8.

Notes:

PFC = perfluoroalkyl compound
PFDA = perfluorodecanoic acid
PFDoDA = perfluorododecanoic acid
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoate acid
PFOS = perfluorooctanesulfonic acid
PFTrDA = perfluorotridecanoic acid
PFUnDA = perfluoroundecanoic acid
-- = provisional guidelines are not available for drinking water

[a] Units for all results are parts per trillion (ppt).

[b] USEPA (2009) provisional drinking water advisory for short-term exposure.

[c] NCDENR (2013) recommended interim maximum allowable concentration (IMAC) in drinking water, effective date December 6, 2006.

[d] NJDEP (2007) health-based guidance value intended to protect for chronic (lifetime) exposure.

[e] MDH (2011) health risk limit (HRL) in drinking water for chronic exposure.

Table 5. Paulsboro PWS Ground and Drinking Water Standard Exceedences, Detected Analytes Only

	Screening Standards			Paulsboro PWS Results Exceeding Standards by Well or Tap Location and Sample Number[a]					
				PB - City Hall Sink Tap	PB - Port Break Area Sink	Well #7 (PB-PWS-7)		Well #8 (PB-PWS-8)	Well #9 (PB-PWS-9)
Chemical Group/ Analyte	NJDEP Ground Water Quality Standard[b] Class IIA	NJDEP Drinking Water Standard	Units	GW0165 Drinking Water	GW0166 Drinking Water	GW0161[c,d] Raw Water	GW0163[c,d] Raw Water	GW0162 Treated Water	GW0164 Raw Water
Conventionals									
pH[e]	6.5–8.5	6.5–8.5	SU	--	--	5.66 HF	5.23 HF	--	4.54 HF
Metals									
Aluminum	200	200	µg/L	--	477	228	235	--	1,480
Beryllium	1	NA	µg/L	--	2 J	2.3 J	2.4 J	--	1.2 J
Iron	300	300	µg/L	629	5180	7,060	6,850	--	9,400
Lead	5	15	µg/L	--	--	9.6 [f]	-- [f]	--	21.6
Manganese	50	50	µg/L	53.2	181	109	109	--	164
Sodium	50,000	50,000	µg/L	--	--	--	--	--	51,000
VOCs									
Bromoform	4	NA	µg/L	6.9	9.2	--	--	--	--
Chlorodibromomethane	1	NA	µg/L	15	20	--	--	7.2	--
Dichlorobromomethane	1	NA	µg/L	11	15	--	--	6	--

Sources:

NJDEP. 2011. Ground water quality standards - Class IIA by constituent. Available at: www.nj.gov/dep/standards/ground%20water.pdf. New Jersey Department of Environmental Protection, NJ. 7 pp. July 27.

NJDEP. 2009. Drinking water standards by constituents. Available at: www.nj.gov/dep/standards/drinking%20water.pdf. New Jersey Department of Environmental Protection, NJ. 4 pp. October 13.

Notes:

NA = not available
NJDEP = New Jersey Department of Environmental Protection
PWS = public water system
VOC = volatile organic compound
-- = not applicable; no exceedance

HF = analysis exceeded sample hold time
J = result was detected at or greater than the method detection limit and less than method reporting limit

[a] Results were validated by TestAmerica, but data were not submitted for third party validation.

[b] NJDEP Ground Water Quality Standards for Class IIA constituents. Standards were selected as the higher of the practical quantitation level and the ground water quality standard.

[c] Field duplicates and parent samples are summarized as follows:

Field Duplicate	Parent
GW0163	GW0161

[d] Relative percent difference (i.e., range divided by average) of parent/duplicate pairs ranges from 0 to 7 percent.

[e] Standards are expressed as a range of pHs with exceedance indicated if results are outside this range.

[f] Results for the parent sample (GW0161) did not exceed the ground or drinking water standards. The relative percent difference between the parent/duplicate pair was 187.10 percent.

Table 6. Quarter 3 PWS Detected Concentrations for PFCs Compared with Past Sampling Events [a,b]

Chemical	Location	Sample Material	Quarter 3 Concentration (ppt)	Range of Detected Value Across Sampling Events	Mean Detected Value Across Sampling Events	Range Across Sampling Events	RPD
PFOA	Well #7 (PB-PWS-7)	Raw/Treated	36	21 – 36	28	15	51%
	Well #8 (PB-PWS-8)	Raw/Treated	18	13 – 19	17	6	36%
	Well #9 (PB-PWS-9)	Raw water	44	26 – 44	35	18	52%
PFOS	Well #7 (PB-PWS-7)	Raw/Treated	6.3	3.6 – 6.3	5.3	2.7	34%
	Well #8 (PB-PWS-8)	Raw/Treated	7.8	6.25 – 15	9.7	8.75	90%
	Well #9 (PB-PWS-9)	Raw water	5.5	1.4 – 5.5	2.8	4.1	145%
PFNA	Well #7 (PB-PWS-7)	Raw/Treated	140	80 – 140	110	60	42%
	Well #8 (PB-PWS-8)	Raw/Treated	15	13.5 – 15	14.5	1.5	10%
	Well #9 (PB-PWS-9)	Raw water	11	7.4 – 11	9.5	3.6	38%

Notes:
PFC = perfluoroalkyl compound
PFNA = perfluorononanoic acid
PFOA = perfluorooctanoate acid
PFOS = perfluorooctanesulfonic acid
PWS = public water system
RPD = relative percent difference.

[a] Units for all results are nanograms per liter (ng/L) or parts per trillion (ppt). Laboratories reported concentrations to two significant figures.
[b] Parent and field duplicate samples are averaged. Raw and treated samples are averaged.
[c] RPD equals the range divided by the arithmetic mean.

EUROFINS LABORATORY REPORTS

- LDC VALIDATION REPORT – PAULSBORO (488755)
- EUROFINS LABORATORY REPORT (488755 7/23/2014)
- EUROFINS LABORATORY REPORT (LCMS 7/16/2014)

LDC VALIDATION REPORT

– PAULSBORO (488755)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Integral Consulting Inc.
1205 West Bay Drive NW
Olympia, WA 98502
ATTN: Mr. Craig Hutchings

August 22, 2014

SUBJECT: Revised PFCs, Project #C1165, Data Validation

Dear Mr. Hutchings,

Enclosed is the revised validation report for the fraction listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project #32247:

SDG#	Fraction
488755	Perfluorinated Alkyl Acids

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 32247A96_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: PFCs, Project #C1165

LDC Report Date: August 22, 2014

Matrix: Water

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 2B & 4

Laboratory: Eurofins

Sample Delivery Group (SDG): 488755

Sample Identification	Collection Date	Laboratory Sample Identification
GW0161**	07/08/14	201407090596
GW0162	07/08/14	201407090597
GW0163	07/08/14	201407090598
GW0164	07/08/14	201407090599
GW0165	07/08/14	201407090600
GW0166	07/08/14	201407090601
FB0001	07/08/14	201407090602

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 537 for Perfluorinated Alkyl Acids.

This review follows the Site Specific Quality Assurance Project Plan (QAPP) dated November 15, 2013 and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Stage 4 review. A Stage 2B review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Stage 2B criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J+ Data are qualified as estimated, with a high bias likely to occur.

J- Data are qualified as estimated, with a low bias likely to occur.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The compound or analyte was found in an associated blank as well as in the sample.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Peak Resolution
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Estimated Maximum Possible Concentration
24 Less than reporting limit
25 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed as required by the method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were within QC limits for all compounds.

The percent differences (%D) of the second source calibration standard were within QC limits for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No perfluorinated alkyl acid contaminants were found in the method blanks.

Sample FB0001 was identified as a field blank. No perfluorinated alkyl acid contaminants were found.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QAPP limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. The MS/MSD analysis was performed on a non-client sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QAPP limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII. Compound Quantitation

All compound quantitations were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XIII. System Performance

The system performance was acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XIV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XV. Field Duplicates

Samples GW0161** and GW0163 were identified as field duplicates. No perfluorinated alkyl acids were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)
	GW0161**	GW0163	
Perfluorononanoic acid	0.14	0.14	0 (≤35)
Perfluorooctanesulfonic acid	0.0064	0.0061	5 (≤35)
Perfluorooctanoic acid	0.036	0.036	0 (≤35)

PFCs, Project #C1165
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 488755

No Sample Data Qualified in this SDG

PFCs, Project #C1165
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 488755

No Sample Data Qualified in this SDG

PFCs, Project #C1165
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 488755

No Sample Data Qualified in this SDG

LDC #: 32247A96
SDG #: 488755
Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET

~~Level IV~~ Stage 4/2B

Date: 7/26/14
Page: 1 of 1
Reviewer: JR
2nd Reviewer: AV

METHOD: LCMS Perfluorinated Alkyl Acids (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/8/14
II.	LC/MS Instrument performance check	A	
III.	Initial calibration	A	r2
IV.	Continuing calibration/ICV	A	ccv/icv ≤ QC limits
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A+HR	MS-client
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	
XII.	Compound quantitation/CRQLs	A	
XIII.	System performance	A	
XIV.	Overall assessment of data	A	
XV.	Field duplicates	SW	D = 1 + 3
XVI.	Field blanks	ND	FB = 7

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: W ** Stage 4

1	GW0161 **	11		21		31	
2	GW0162	12		22		32	
3	GW0163	13		23		33	
4	GW0164	14		24		34	
5	GW0165	15		25		35	
6	GW0166	16		26		36	
7	FB0001	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 32247A96

VALIDATION FINDINGS CHECKLIST

Reviewer: VR
2nd Reviewer: CV

Method: LC/MS

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?			✓	
Was a curve fit used for evaluation?	✓			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ QC limits	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓	✓		
Was a MS/MSD analyzed every 20 samples of each matrix?	✓		NA	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓		✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Internal standards				
Were internal standard area counts within acceptance limits?	✓			
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			

LDC #: 32247A96

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

LDC#: 32247A96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: A
2nd Reviewer: A

METHOD: LC MS PFACs (EPA Method 537)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (µg/L)		RPD (≤ 35)
	1	3	
Perfluorononanoic acid	0.14	0.14	0
Perfluorooctanesulfonic acid	0.0064	0.0061	5
Perfluorooctanoic acid	0.036	0.036	0

V:\FIELD DUPLICATES\32247A96.wpd

Method: LC/MS PAH (EARL SOP 2012-O-128.4)

Calibration Date	Analyte	Standard	(X) Concentration	(Y) Area
7/16/2014	PFNA	1	0.061190	0.000025
		2	0.11623	0.00005
		3	0.23824	0.00010
		4	0.46954	0.00020
		5	0.93523	0.00040
		6	1.78303	0.00080

Linear through the origin

	Calculated	***Reported***
Constant	*0.000000*	*0.000000*
X Coefficient(s)	*2257.09803679*	*2256.76438000*
Correlation Coefficient	*0.999761*	*0.999690*
Coefficient of Determination (r^2)	*0.999521*	

LDC #: 32247A96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCCL	7/16/14	PFNA (1st internal standard)	0.0025	0.00264	0.00264	NR	5.6
			(2nd internal standard)					
			(3rd internal standard)					
2	CCCM	7/17/14	PFNA (1st internal standard)	0.0200	0.020126	0.020127	NR	0.6
			(2nd internal standard)					
			(3rd internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 32247A96

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: [signature]
2nd reviewer: [signature]

METHOD: LC/MS

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
13C-PFDA	100	80.80746	81	81	0

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 32247A96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: A
2nd Reviewer: A

METHOD: LC/MS

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 781237LCS/D

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFNA	0.025	0.025	0.0248	0.0251	99	99	103	103	3.6	3.6

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 32247A96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: N
2nd reviewer: N

METHOD: LC/MS

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFNA:

Conc. = $\frac{(6.989e5)(100)(5)(\ )(\ )(\ )}{(1.071e6)(2256.76438)(\ )(\ )}$

= 0.14 ng/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

EUROFINS LABORATORY REPORT

– 488755 7/23/2014

[ON ENCLOSED CD]

EUROFINS LABORATORY REPORT

– 488755 LCMS 7/16/2014

[ON ENCLOSED CD]

TestAmerica Laboratory Reports

- TestAmerica Laboratory Report (460-79039-1 8/11/2014)
- TestAmerica Laboratory Report (460-79046-1 8/11/2014)
- TestAmerica Laboratory Report (460-79049-1 8/11/2014)
- TestAmerica Laboratory Report (460-79051-1 8/11/2014)
- TestAmerica Laboratory Report (460-79062-1 8/8/2014)
- TestAmerica Laboratory Report (460-79071-1 8/8/2014)
- TestAmerica Laboratory Report (460-79073-1 8/8/2014)

[On Enclosed CD]